2019–2020 NTSB

MOST WANTED LIST OF TRANSPORTATION SAFETY IMPROVEMENTS

RAILROAD

Strengthen Occupant Protection

What is the problem?

We've investigated too many accidents in which enhanced rail compartment design could have improved the outcome, reducing injuries and saving lives.

Rail passenger cars use a design philosophy called compartmentalization, which features seats that are closely spaced, high backed, well-padded, and designed to absorb energy during an accident. However, compartmentalization may not protect passengers during derailments and overturns.

In May 2015, an Amtrak train derailed in Philadelphia, Pennsylvania, after proceeding through a 50-mph turn at 106 mph. Of the 245 passengers on board, 8 were killed and 185 were transported to nearby hospitals. During the derailment, riders were thrown around the passenger cars and windows did not remain intact, resulting in ejections, injuries, and fatalities.

Compartmentalization may not protect passengers in passenger rail car derailments and overturns

Related reports:

RAR-16/02: Derailment of Amtrak Passenger Train 188; Philadelphia, Pennsylvania; May 12, 2015; Accident ID DCA15MR010

RAB-14/12: Metro-North Railroad Derailment; Bronx, New York; December 1, 2013; Accident ID DCA14MR002

RAR-12/02: Collision of BNSF Coal Train With the Rear End of Standing BNSF Maintenance-of-Way Equipment Train; Red Oak, Iowa; April 17, 2011; Accident ID DCA11FR002

RAR-09/01: Collision of Amtrak Passenger Train 371 and Norfolk Southern Railway Company Freight Train 23M; Chicago, Illinois; November 30, 2007; Accident ID DCA08MR003

For detailed investigation reports, visit www.ntsb.gov

On May 12, 2015, eastbound Amtrak passenger train 188 derailed in Philadelphia, Pennsylvania, with 245 passengers and 8 Amtrak employees on board. The train had entered a curve—where the speed is restricted to 50 mph—at 106 mph. Eight passengers died and 185 others were injured. We found that if the passenger car windows had remained intact and secured, some passengers would not have been ejected and would likely have survived. Further, many passengers were seriously injured after being thrown from their seats when the cars overturned. Investigators, seen below at the scene of the accident, concluded that the current passenger equipment safety standards were inadequate.

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What can be done?

Current safety standards for locomotive cabs and rail passenger cars are inadequate. Although some safety improvements have been made to better protect occupants of rail passenger cars from injury and death, as we saw in the Amtrak 188 accident, more still needs to be done. To minimize deaths and injuries in all modes of transportation, occupant protection systems need to be better designed to preserve survivable space and ensure ease of evacuation.

To address the problem of inadequate occupant protection, the following actions should be taken:

Regulators

› Require enhanced rail cab and car design to ensure better occupant protection. When Amtrak 188 derailed, passenger car windows became dislodged and some passengers were ejected and killed. Additionally, when the cars overturned, passengers were thrown from their seats and struck by loose objects, resulting in severe injuries. Had the windows in Amtrak 188 remained in place, the ejected passengers would likely have remained inside the train and survived.

› Evaluate the causes of passenger injuries in passenger railcar derailments and overturns and evaluate potential methods for mitigating injuries, such as installing seat belts in rail cars and securing potential projectiles.

On December 1, 2013, southbound Metro-North Railroad passenger train 8808, en route to Grand Central Station in New York City, derailed on main track 2 of the Metro-North Hudson Line. Four people died and at least 61 were injured. Contributing to the severity of the accident was the loss of the window glazing that resulted in the fatal ejection of four passengers from the train.

Industry

› Adopt existing voluntary standards that address crashworthiness and strengthen occupant protection for train passengers and crews. Protecting passengers and crews from injury requires keeping railcar windows intact and maintaining their structural integrity during an accident, and includes occupant restraint systems, such as seat belts, to mitigate the severity of passenger injuries. Incorporate design elements that optimize crashworthiness and enhance ease of evacuation in an emergency.

MWL
MOST WANTED LIST

Critical changes needed to reduce transportation accidents, injuries, and fatalities

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NTSB National Transportation Safety Board

The NTSB **MOST WANTED LIST** highlights safety issues identified from the NTSB's accident investigations to increase awareness about the issues and promote recommended safety solutions.

For more information visit **www.ntsb.gov/mostwanted** or contact **SafetyAdvocacy@ntsb.gov**

The NTSB is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation—railroad, highway, marine, and pipeline. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents. In addition, the NTSB carries out special studies concerning transportation safety and coordinates the resources of the federal government and other organizations to provide assistance to victims and their family members impacted by major transportation disasters.

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